

**APPARATUS FOR CONTROLLING FLOW RATE FROM A VALVE
DISPENSER**

This invention relates to dispensing apparatus and to a user operated valve assembly for use with a dispensing apparatus. Particularly, but not exclusively it relates to a dispensing apparatus and valve assembly for dispensing viscous materials from a container under pressure of a propellant.

It is known to provide a dispensing apparatus which includes a valve mechanism fitted to a container filled with a product, for example mastic or sealant, which is to be dispensed. An example of such an apparatus is disclosed in WO 01/49585 (Rocep Lusol Holdings Limited). The user presses the handle of a lever to open the valve and dispense product from the pressurised container. In apparatus using a tilt valve the user pushes the valve stem to one side to open the valve and dispense product from the pressurised container. However such dispensers are intended for use only in

1 situations where a full flow of product is required.
2 There is no intermediate setting of the valve which
3 permits an intermediate flow rate, and it can be
4 difficult to ensure a steady stream of flow unless
5 the valve is fully open.

6

7 It is an object of the present invention to provide
8 a dispensing apparatus which overcomes one or more
9 of the above disadvantages.

10

11 According to the present invention there is provided
12 a valve assembly for use with a dispensing
13 apparatus, the valve assembly comprising:

14 a valve;

15 a lever arranged to open the valve to dispense
16 product; and

17 variable spacer means arranged to limit the
18 travel of the lever by a variable amount according
19 to the relative position of the lever and the
20 variable spacer means.

21

22 According to a first aspect of the present invention
23 the valve is a tilt valve including a valve stem,
24 and the lever is coupled to the valve stem.

25

26 Preferably the variable spacer means is adapted to
27 prevent travel of the lever in a particular relative
28 position of the lever and the variable spacer means.
29 In this position the lever cannot be operated so
30 that the valve is effectively locked in a closed
31 position.

32

1 Preferably the valve assembly includes a nozzle.
2 Preferably the lever is integral with the nozzle.
3 Preferably the nozzle is sealingly engaged with the
4 valve stem.

5
6 Preferably the variable spacer means includes a
7 plurality of spacer portions of differing thickness,
8 each spacer portion being arranged to limit the
9 travel of the lever by a predetermined amount. One
10 spacer portion may be arranged to allow a full range
11 of travel of the lever so that by pressing the lever
12 fully the valve is fully opened. Another spacer
13 portion may be arranged to allow a partial range of
14 travel of the lever so that by pressing the lever
15 fully the valve is opened to an intermediate flow
16 setting. Further spacer portions may be arranged to
17 provide further intermediate flow settings.

18
19 Alternatively the variable spacer means may comprise
20 a cam surface arranged to limit the travel of the
21 lever by an amount which varies with the relative
22 position of the lever and the variable spacer means.
23 This allows the user of the valve assembly infinite
24 adjustment of the flow rate by selecting a
25 particular relative position of the lever and the
26 variable spacer means.

27
28 In a first preferred embodiment of the first aspect
29 the variable spacer means comprises a collar which
30 in use engages with a container with which the valve
31 assembly is used.

32

1 Preferably the spacer portions comprise a plurality
2 of portions of the collar of different height
3 adapted to contact the lever when the lever is at
4 the limit of its travel. Preferably the lever is
5 rotatably mounted relative to the valve so that in
6 use the lever is rotated to select a required limit
7 of travel of the lever and hence a required flow
8 setting of the valve. The collar may be provided
9 with markings to indicate the flow setting
10 associated with each portion of the collar.

11

12 Preferably the collar is adapted to press fit on the
13 rolled flange of a standard pressurised container.

14

15 In a second preferred embodiment of the first aspect
16 the variable spacer means comprises a collar
17 rotatably mounted around the valve stem beneath the
18 lever.

19

20 Preferably the spacer portions comprise a plurality
21 of portions of the collar of different thickness
22 adapted to space the lever from the container with
23 which the valve assembly is used when the lever is
24 at the limit of its travel. Preferably the collar
25 is rotatably mounted relative to the valve so that
26 in use the collar is rotated to select a required
27 limit of travel of the lever and hence a required
28 flow setting of the valve. The collar may be
29 provided with markings to indicate the flow setting
30 associated with each portion of the collar.
31 Alternatively the lever could be rotated relative to
32 the valve and the collar fixed.

1

2 Preferably the collar is in the form of a clip
3 having a radial slot. In this way the collar can be
4 readily fixed to a valve stem with a lever already
5 in place.

6

7 Preferably the collar is mounted on a portion of the
8 nozzle which extends below the lever. This allows
9 the nozzle, lever and collar to be pre-assembled as
10 a nozzle assembly which can then be snap fitted onto
11 the valve stem of a tilt valve at any stage in the
12 manufacturing process.

13

14 Preferably the collar is arranged to engage the
15 rolled flange of a container with which the valve
16 assembly is used when the lever is at the limit of
17 its travel.

18

19 In a third preferred embodiment of the first aspect
20 the nozzle serves as the lever. Alternatively the
21 lever is provided between the nozzle and the valve
22 stem and is substantially axially aligned with the
23 valve stem. Preferably the variable spacer means is
24 arranged to limit the lateral travel of the nozzle
25 or lever by a variable amount according to the
26 direction in which the nozzle or lever is displaced.

27

28 Preferably the spacer means comprises a collar which
29 in use engages with a container with which the valve
30 assembly is used.

31

1 Preferably the variable spacer means comprise a
2 plurality of spacer portions. Preferably the spacer
3 portions comprise a plurality of recessed portions
4 of the collar of different depths adapted to contact
5 the nozzle or lever when the nozzle or lever is
6 displaced towards said recessed portion. Each
7 recessed portion provides a different limit of
8 travel of the nozzle or lever and thus corresponds
9 to a different flow setting of the valve assembly.

10

11 Alternatively the variable spacer means may comprise
12 a cam surface of the collar adapted to contact the
13 nozzle or lever when the nozzle or lever is
14 displaced laterally and provide a limit of travel,
15 the limit of travel varying with the direction in
16 which the nozzle or lever is displaced.

17

18 The collar may include a sleeve substantially
19 surrounding the valve stem. The collar may be
20 provided with markings to indicate the flow setting
21 associated with each recessed portion.

22

23 Preferably the collar is adapted to press fit on the
24 rolled flange of a standard pressurised container.

25

26 According to a second aspect of the present
27 invention there is provided a dispensing apparatus
28 comprising a container and a valve assembly
29 according to the first aspect.

30

31 Preferably the apparatus comprises means for urging
32 the product from the container. Preferably the

1 container is pressurised. The container may contain
2 a propellant. The container may contain a piston,
3 situated between the propellant and the valve.

4

5 Preferably the valve assembly comprises a mounting
6 cup adapted to secure the valve to the container.
7 Preferably the container is provided with a rolled
8 flange portion and the mounting cup is provided with
9 a corresponding flange portion adapted to engage
10 with the rolled flange portion of the container.

11

12 According to a third aspect of the present invention
13 the valve assembly further comprises an actuator
14 which co-operates with a bearing portion of the
15 lever such that operation of the lever from a primed
16 position to a dispensing position causes movement of
17 the actuator to open the valve;

18 wherein the variable spacer means comprises an
19 adjustable spacing means provided on the lever which
20 can be adjusted to limit the travel of the lever.

21

22 Preferably the adjustable spacing means comprises an
23 abutting member which is movable to a selected one
24 of a plurality of positions. Preferably the
25 abutting member is adapted to space the lever from a
26 container with which the valve assembly is used at
27 the limit of travel of the lever.

28

29 Preferably the abutting member is arranged such that
30 for each of the plurality of positions of the
31 abutting member there is a corresponding position of
32 the lever at the limit of travel of the lever.

1
2 Preferably the lever includes a handle which in use
3 extends along a portion of the side of a container
4 with which the valve assembly is used. Preferably
5 the adjustable spacing means is provided at the
6 handle. Preferably the lever is substantially L-
7 shaped. The angle of the L-shape may be understood
8 to be between approximately 60 degrees and 120
9 degrees, depending on the shape of the container
10 with which the valve assembly is used. Preferably
11 the bearing portion is provided on a first leg of
12 the L-shape and the handle is provided on the other,
13 second leg of the L-shape.

14
15 Preferably the valve assembly includes fixing means
16 for fixing the valve assembly to a container. The
17 fixing means may be a mounting cup.

18
19 Preferably the lever is pivotally connected to the
20 valve assembly by a hinge. Preferably the hinge is
21 at the free end of the first leg of the L-shape.
22 The hinge may be provided on a collar secured to the
23 valve. The collar may be secured by the fixing
24 means.

25
26 In one embodiment of the third aspect the actuator
27 is provided with a cam surface which co-operates
28 with the lever bearing portion, such that upon
29 rotation of the actuator the lever bearing portion
30 is raised by action of the cam surface.

31

1 Preferably the cam surface comprises one or more
2 depressions and one or more raised surfaces.

3

4 Preferably the lever has two lever bearing portions
5 arranged at opposite sides of the valve. Preferably
6 the actuator is a ring and the cam surface comprises
7 two depressions arranged at opposite sides of the
8 ring and two raised surfaces arranged between the
9 depressions at opposite sides of the ring.

10

11 In a further embodiment of the third aspect the
12 actuator is threadedly engaged with a valve stem of
13 the valve. Preferably the actuator is provided with
14 a bearing surface which co-operates with the lever
15 bearing portion, such that upon rotation of the
16 actuator relative to the valve stem the lever
17 bearing portion is raised by action of the bearing
18 surface.

19

20 Preferably the valve assembly includes a nozzle
21 which is rotationally coupled to the actuator.
22 Preferably the actuator comprises a ring member
23 arranged at a lower end of the nozzle. The actuator
24 may be integral with the nozzle.

25

26 Preferably the actuator is provided with means to
27 limit the rotational travel of the actuator. These
28 means may comprise two end stops provided on the
29 actuator adapted to locate against an upstand on the
30 valve assembly.

31

1 Preferably the valve is a tilt valve. Tilt valves
2 are generally known in dispensing apparatus and
3 operate by tilting of a hollow central stem which is
4 resiliently held on a mounting cup by a rubber
5 grommet. The stem is closed at its lower end by a
6 sealing plate. When the stem is tilted, the seal
7 between the grommet and the sealing plate is broken
8 and the product can reach apertures in the central
9 stem and thence flow along the hollow stem.

10

11 Preferably the actuator comprises one or more dog
12 teeth and the hinge assembly comprises one or more
13 slots, adapted such that a dog tooth can enter a
14 slot only when the nozzle assembly is in the open
15 position. The nozzle assembly is preferably coupled
16 to the valve stem for longitudinal movement, such
17 that movement of the nozzle assembly towards the
18 container causes the dog tooth to enter the slot and
19 the valve stem to move, thereby opening the valve to
20 release the product.

21

22

23 According to a fourth aspect of the present
24 invention there is provided a dispensing apparatus
25 comprising a container, a nozzle and a valve
26 assembly arranged between the container and the
27 nozzle, the valve assembly comprising:

28 a valve;

29 a lever having a bearing portion; and

30 an actuator which co-operates with the bearing
31 portion of the lever such that operation of the
32 lever from a primed position to a dispensing

1 position causes movement of the actuator to open the
2 valve;

3 wherein the lever comprises an adjustable
4 spacing means which can be adjusted to limit the
5 travel of the lever.

6
7 Preferably the adjustable spacing means comprises an
8 abutting member which is movable to a selected one
9 of a plurality of positions. Preferably the
10 abutting member moves by sliding. Preferably the
11 abutting member is adapted to engage resiliently in
12 each of the plurality of positions.

13
14 Preferably the lever has a handle portion.
15 Preferably the abutting member is adapted to space
16 the handle portion of the lever from the container
17 at the limit of travel of the lever.

18
19 Preferably the abutting member is arranged such that
20 for each of the plurality of positions of the
21 abutting member there is a corresponding position of
22 the handle at the limit of travel of the lever.

23
24 Preferably the valve assembly is a valve assembly
25 according to the first aspect of the invention.

26
27 Preferably the actuator is provided with a cam
28 surface which co-operates with the lever bearing
29 portion. Preferably the actuator is rotationally
30 coupled to the nozzle.

31

1 Preferably the apparatus comprises means for urging
2 the product from the container. Preferably the
3 container is pressurised. The container may contain
4 a propellant. The container may contain a piston,
5 situated between the propellant and the valve.

6

7 Preferably the valve comprises a mounting cup
8 adapted to secure the valve to the container.

9 Preferably the container is provided with a rolled
10 flange portion and the mounting cup is provided with
11 a corresponding flange portion adapted to engage
12 with the rolled flange portion of the container.

13

14 Specific embodiments of the invention will now be
15 described, by way of example only, with reference to
16 the accompanying drawings in which:

17

18 Fig. 1 shows a collar of a valve assembly
19 according to the invention;

20

21 Fig. 2 shows a section through a valve assembly
22 including the collar of Fig. 1 with the lever in a
23 primed position and the valve closed;

24

25 Fig. 3 shows a section through the valve
26 assembly of Fig. 2 with the collar in an
27 intermediate flow position and the lever at the
28 limit of its travel with the valve opened to an
29 intermediate flow setting;

30

31 Fig. 4 shows a section through the valve
32 assembly of Fig. 2 with the collar in a full flow

1 position and the lever at the limit of its travel
2 with the valve fully open;
3

4 Fig. 5 shows a section through another valve
5 assembly according to the invention before
6 attachment of the collar with the lever in a primed
7 position and the valve closed;
8

9 Fig. 6 shows a section through the valve
10 assembly of Fig. 5 with the collar attached in an
11 intermediate flow position and the lever at the
12 limit of its travel with the valve opened to an
13 intermediate flow setting;
14

15 Fig. 7 shows a section through the valve
16 assembly of Fig. 5 with the collar attached in a
17 full flow position and the lever at the limit of its
18 travel with the valve fully open;
19

20 Fig. 8 shows an exploded view of another valve
21 assembly according to the invention;
22

23 Fig. 9 shows the valve assembly of Fig. 8 in an
24 assembled state;
25

26 Fig. 10 shows a section through the valve
27 assembly of Fig. 8;
28

29 Fig. 11 shows a further valve assembly
30 according to the invention;
31

1 Fig. 12 is a side elevation on the valve
2 assembly of Fig. 11 with the lever in a parked
3 position;
4

5 Fig. 13 is a side elevation on the valve
6 assembly of Fig. 11 with the lever in a primed
7 position;
8

9 Figs. 14, 15 and 16 show a perspective view, a
10 longitudinal section and a transverse section
11 respectively of the adjustable spacer of a valve
12 assembly according to the invention; and
13

14 Figs. 17 and 18 show the adjustable spacer and
15 the abutting member respectively of another valve
16 assembly according to the invention.
17

18 Referring to Figs. 1 to 4 of the accompanying
19 drawings, there is disclosed a valve assembly 10
20 fitted on a container 12 to form a dispensing
21 apparatus 11. In this example, the container 12 is
22 an aluminium monoblock container of the sort widely
23 used in aerosol applications. It is envisaged that
24 the can 12 could be of tin plate, steel or any
25 conventional can construction having a standard one
26 inch (25 mm) hole in the top. The can may be
27 internally lacquered. However the valve assembly of
28 the present invention can be used with a container
29 12 of any material holding a pressurised product,
30 for example a container of plastic, glass or metal.
31

1 The valve assembly 10 includes a valve 14, a nozzle
2 assembly 16, a lever 18 and a collar 20 secured to
3 the container 12. The valve is a tilt valve of the
4 type widely used in pressurised dispensers and
5 operated by tilting the valve stem 30. The valve
6 stem 30 is a hollow plastic tube with apertures 32
7 in the tube wall at the lower end. The upper end 34
8 is open, while the lower end is closed by a plastic
9 sealing disc 36. A resilient grommet 38 of rubber
10 or synthetic material surrounds the lower portion of
11 the stem 30 and is held in place by the sealing disc
12 36 and a retaining collar 31 formed on the outside
13 of the stem 30.

14

15 The grommet 38 is sealed to a mounting cup 44 of
16 metal. The mounting cup has an outer flange 48
17 which is adapted to fit around a rolled flange 13
18 which extends around the opening of the container
19 12. When the stem 30 is tilted, the sealing disc 36
20 is pushed away from the grommet 38 on one side, and
21 material in the container 12 is free to pass between
22 the sealing disc 36 and grommet 38, through the
23 apertures 32, along the inner bore of the stem 30
24 and through the open end 34 of the stem. When the
25 stem is released, the resilience of the grommet 38
26 pushes the stem back to the position shown in Fig 2.

27

28 The nozzle assembly 16 includes a nozzle 22 at its
29 upper end. In the example the nozzle 22 is angled,
30 but it may be straight or positioned at a different
31 angle. In the example the lever 18 is integrally
32 formed with the nozzle assembly 16 as a one-piece

1 plastic moulding, but it may be attached separately.
2 The nozzle assembly sealingly engages at its lower
3 end with the valve stem. This can be by a screw
4 thread or snap fit or any other appropriate
5 engagement means. The nozzle 22 may be provided
6 with a removable nozzle cap (not shown).

7
8 The collar 20 is shown in more detail in Fig. 1.
9 The collar 20 is a ring shaped collar formed of
10 moulded plastic and includes a circular groove 50 in
11 its lower face which is adapted to snap fit over the
12 rolled flange 13 of the container and/or the outer
13 flange 48 of the mounting cup 44.

14
15 The collar 20 is a variable spacing means and has a
16 number of spacer portions 52, 54, 56, each of
17 different height, arranged about the collar. In use
18 the lever 18 is rotated until it extends over the
19 required spacer portion. The user then depresses
20 the lever until the underside 60 of the lever 18
21 contacts the top of the spacer portion, at which
22 point the lever 18 is at the limit of its travel.
23 By positioning the lever over a different spacer
24 portion 52, 54, 56 the user selects a different
25 limit of travel and therefore a different flow
26 setting of the valve. Fig 3 shows the lever 18
27 fully depressed over spacer portion 56, with the
28 valve 14 opened to an intermediate flow setting.
29 Fig 4 shows the lever 18 fully depressed over spacer
30 portion 52, with the valve 14 opened to a fully open
31 flow setting.

32

1 To dispense product, a user presses down on the
2 handle 62 of the lever, moving it from the primed
3 position shown in Fig 2 towards the body of the
4 container 12 to adopt the dispensing position shown
5 in Fig 3 or 4. Because there is a predetermined
6 valve position associated with each dispensing
7 position, product is urged to flow, by virtue of the
8 internal pressurisation of the pack, at a constant
9 predetermined rate through the ports 32 and up
10 through the valve stem 30 and out through the nozzle
11 22.

12
13 To stop dispensing, the user simply releases the
14 handle 62. This closes the valve by allowing the
15 valve stem 30 to tilt back to the position shown in
16 Fig 2 and close access through the ports 32.

17
18 The collar 20 may include a further spacer portion
19 (not shown) which is higher than the other spacer
20 portions 52, 54, 56 and which extends to the
21 underside 60 of the lever 18. The lever could then
22 be rotated to extend over the higher spacer portion
23 to prevent travel of the lever and effectively lock
24 the valve in a closed position. If required the
25 collar may include a corresponding projection
26 diametrically opposite to prevent the lever being
27 pivoted in the opposite direction when the lever is
28 in the "locked" position.

29
30 Figs 5 to 7 show a further embodiment of a valve
31 assembly 10' according to the invention. The
32 container 12, valve 14, nozzle assembly 16 and lever

1 18 are the same as those described above with
2 reference to Figs 2 to 4, and so are not described
3 further.

4
5 In this embodiment the variable spacer means is a
6 ring-shaped collar 80 with a radial slot (not shown)
7 adapted to clip around the shaft of the nozzle
8 assembly 16 beneath the lever 18. In the
9 illustrated embodiment of Figs 6 and 7 the collar
10 has two spacer portions 82, 84, although the number
11 of spacer portions can be varied. In use the lever
12 18 or collar 80 is rotated until the lever 18
13 extends over the required spacer portion 82, 84.
14 The user then depresses the lever until the lever 18
15 urges the spacer portion into contact with the
16 flange 13 of the container 12, at which point the
17 lever 18 is at the limit of its travel. By
18 positioning the lever over a different spacer
19 portion 82, 84 the user selects a different limit of
20 travel and therefore a different flow setting of the
21 valve. Fig 6 shows the lever 18 fully depressed
22 over spacer portion 82, with the valve 14 opened to
23 an intermediate flow setting. Fig 7 shows the lever
24 18 fully depressed over spacer portion 84, with the
25 valve 14 opened to a fully open flow setting.

26
27 Operation is as described for the first embodiment.
28 The collar 80 may include a further spacer portion
29 (not shown) which is deeper than the other spacer
30 portions 82, 84 and which extends over height H as
31 shown in Fig 5 when the lever 18 is in the at-rest
32 position. The lever 18 or collar 80 could then be

1 rotated to prevent travel of the lever and
2 effectively lock the valve in a closed position. If
3 required the collar 80 may include a corresponding
4 projection diametrically opposite to prevent the
5 lever being pivoted in the opposite direction when
6 the lever is in the "locked" position.

7
8 Figs 8 to 10 show a further embodiment of a valve
9 assembly 10" according to the invention. The
10 container 12 and valve 14 are the same as those
11 described above with reference to Figs 2 to 4, and
12 so are not described further.

13
14 In this embodiment nozzle assembly 90 acts as a
15 lever, and the product is dispensed by displacing
16 the nozzle assembly 90 laterally. The variable
17 spacer means is a collar 92 which has a top plate 94
18 and a sleeve 96 which extends down from the top
19 plate to form a flush connection with the wall of
20 the container 12. The collar 92 includes an
21 internal tubular wall 98 which positively engages
22 with the rolled flange 13 which extends around the
23 opening of the container 12.

24
25 The top plate 94 of the collar 92 has three recessed
26 portions 100, 102, 104. The recessed portion 100 is
27 the shallowest of the three. When the nozzle
28 assembly 90 is operated in the direction of the
29 shallowest recessed portion 100 the tilt valve 14
30 can only partially open, so that product flows from
31 the container 12 at a slow flow rate. When the
32 nozzle assembly 90 is operated in the direction of

1 the middle recessed portion 102 the tilt valve 14
2 can open to a greater extent, so that product flows
3 from the container 12 at a medium flow rate. When
4 the nozzle assembly 90 is operated in the direction
5 of the deepest recessed portion 104 the tilt valve
6 14 can open fully, so that product flows from the
7 container 12 at the maximum flow rate.

8
9 Markings 106 can be provided on the collar 92 to
10 indicate the flow rate associated with each recessed
11 portion 100, 102, 104. The top plate 94 is provided
12 with a flange 108 of the same diameter as the rolled
13 flange 13 of the container 12, so that a cap 110
14 adapted to fit on the rolled flange 13 can also fit
15 on the collar 92.

16
17 Modifications and improvements may be made to the
18 foregoing without departing from the scope of the
19 invention. In particular the step-like spacer
20 portions 52, 54, 56, 82, 84 or recesses 100, 102,
21 104 of the illustrated embodiments may be replaced
22 by cam surfaces which allow quasi-infinite
23 adjustment of the maximum travel of the lever. The
24 variable spacer means 20, 80, 92 may have shapes and
25 forms other than those illustrated. The shape and
26 form of the lever 18 and nozzle assembly 90 may be
27 varied. The collar 82, 84 may be rotatably or
28 slidably fixed to the underside 80 of the lever.
29 The spacer portions may be adapted to bear on a part
30 of the container 12 or mounting cap 44 other than
31 the rolled flange 13. The spacer portions 52, 54,
32 56, 82, 84 may be provided with locating grooves or

1 other means to encourage engagement with the lever
2 18 at particular relative rotational positions.

3
4 Referring now to Figs. 11 to 13 of the accompanying
5 drawings, there is disclosed another valve assembly
6 210 according to the invention fitted on a container
7 212 to form a dispensing apparatus 211. In this
8 example, the container 212 is an aluminium monoblock
9 container of the sort widely used in aerosol
10 applications. It is envisaged that the can 212
11 could be of tin plate, steel or any conventional can
12 construction having a standard one inch (25 mm) hole
13 in the top. The can may be internally lacquered.
14 However the valve assembly of the present invention
15 can be used with a container 212 of any material
16 holding a pressurised product, for example a
17 container of plastic, glass or metal.

18
19 The valve assembly 210 includes a valve (not shown),
20 a hinge collar 216, a lever 218 and an actuator 220
21 including a nozzle 222 and cap 282. The valve is a
22 tilt valve of the type widely used in pressurised
23 dispensers and operated by tilting the valve stem.
24 The valve assembly, excluding handle 302, is
25 described in WO01/49585 and is not described further
26 here.

27
28 When the actuator is in the primed or open position,
29 as in Fig 13, then depression of the handle 302
30 towards the container 212 causes the bearing portion
31 300 of the lever 218 to push the actuator 220 in the
32 direction of arrow A towards the hinge assembly 216.

1 The actuator 220 is linked to the valve stem to
2 prevent relative longitudinal movement of the valve
3 and nozzle 222. The linking means may comprise a
4 thread or a rib and groove arrangement.

5

6 To dispense product, a user then presses down on the
7 lever handle 302, moving it from the primed position
8 shown in Fig 13 towards the body of the container
9 212 to adopt the dispensing position shown in Fig
10 12.

11

12 As seen more clearly in Figs 14 to 16, the handle
13 302 includes a plate 320, typically of moulded
14 plastic, which may be fixed by snap fit or sliding
15 onto the wires 322 which form the handle. The plate
16 320 is provided with an adjustable spacing means 324
17 in the form of an abutting member 326 which is held
18 in a slot 328 in the plate 320. The abutting member
19 326 has a thumb grip 330 and can slide
20 longitudinally along the handle 302. When the
21 abutting member 326 is in a first position 326'
22 shown in Fig 13, the handle 302 can only move a
23 limited distance towards the container 212 to a
24 first dispensing position, so that the valve is only
25 opened to an intermediate flow position. When the
26 abutting member 326 is in a second position 326''
27 shown in Fig 13, the handle 302 can move a greater
28 distance towards the container 212 to a second
29 dispensing position, so that the valve is opened to
30 a fully open flow position.

31

1 It is to be understood that detent formations may be
2 formed in the abutting member 326 and/or plate 320
3 so that the adjustable spacing means 324 is readily
4 set at the required dispensing position. If the
5 abutting member 326 is moved to further intermediate
6 positions, then the valve may be opened to further
7 intermediate flow positions. There may be two,
8 three or more intermediate dispensing positions.

9
10 The plate 320 and/or thumb grip 330 are provided
11 with markings 332 which indicate the position to
12 which the abutting member 326 must be moved to
13 achieve a particular flow position. The flow
14 position may be set while the lever 218 is in the
15 parked or primed position, so that pressing the
16 handle 302 towards the container 212 from the primed
17 position results in the required flow rate of
18 product. The abutting member 326 effectively spaces
19 the handle 302 from the container 312 at the limit
20 of travel of the lever 218. The abutting member 326
21 is arranged such that for each of a plurality of
22 positions of the abutting member 326 there is a
23 corresponding position of the lever 218 at the limit
24 of travel of the lever.

25
26 When the valve is open product is urged to flow, by
27 virtue of the internal pressurisation of the pack,
28 through the valve stem and out through the nozzle
29 222.

30
31 To stop dispensing, the user simply releases the
32 lever handle 302. This closes the valve by allowing

1 the valve stem to slide back and close access
2 through the valve.

3
4 The abutting member 326 may be of any suitable shape
5 or size which can be positively engaged in the slot.
6 In the example of Figs 14 to 16 the member 326
7 includes split legs 334 having detent portions 336
8 to non-removably engage with the slot. Figs 17 and
9 18 show an alternative form of abutting member 326',
10 which may be engaged by pushing through the thumb
11 grip portion 330' through the slot 328 in the
12 resilient plate 320. However the abutting member
13 may be a simple sliding device slidably mounted on
14 the wire 322 of the handle 302, or a device which
15 slidably engages with the edge of the handle plate
16 320.

17
18 Modifications and improvements may be made to the
19 foregoing without departing from the scope of the
20 invention. In particular the means of coupling
21 vertical movement of the bearing portion 300 of the
22 lever with opening of the valve is not limited to
23 the embodiments described above, and the adjustable
24 spacing means of the valve assembly of the invention
25 may be used with any suitable valve, lever and
26 actuator.